ABSTRACT

A traveling-wave ring laser resonator includes one or more gain-elements for generating fundamental radiation and three optically nonlinear crystals. A portion of the fundamental radiation is converted to second-harmonic radiation in a first of the crystals. Remaining fundamental radiation and the second-harmonic radiation traverse a second of the optically nonlinear crystals where a portion of each is converted to third-harmonic radiation. Fundamental and second-harmonic radiation pass through the third of the optically nonlinear crystals where most of the second-harmonic radiation is converted back to fundamental radiation. The third-harmonic radiation can be delivered from the resonator as output radiation or mixed with the fundamental radiation in a fourth optically nonlinear crystal to generate fourth harmonic radiation. An optical parametric oscillator arrangement is also disclosed.